



# Knowledge and use of voluntary food and drink guidelines in English nurseries? Results from a nationally representative cross-sectional study

Emily Warren<sup>\*</sup>, Paul Boadu, Josephine Exley, Lorraine Williams, Bob Erens, Cécile Knai

Policy Innovation and Evaluation Research Unit, London School of Hygiene & Tropical Medicine, Faculty of Public Health and Policy, London, United Kingdom

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## ABSTRACT

Good nutrition in early life is vital for healthy development, and sets the stage for good health throughout the life-course. Most children aged 0–4 years old in the UK spend at least some time each week in an early years' setting (EYS), such as a nursery or childminder. Unlike schools which serve older children, there are no statutory standards for the food and drinks served to the youngest children in EYS, despite the potential for greater public health gains due to early intervention. Two comprehensive, age-appropriate voluntary guidelines were developed, one called the *Example Menus for Early Years Settings in England* by the government and another, called *Eat Better, Start Better* by a charity. Both are seen as standard across the sector. To assess nurseries' awareness and use of voluntary guidelines, including how they are used and how they can be improved upon, and examine how these vary by socioeconomic deprivation and setting types (private nurseries and voluntary, community and charity nurseries), we conducted the first nationally representative cross-sectional survey of nurseries in England via an online survey. Using frequency distributions and binomial multivariate logistic regression models, considerable discrepancies between awareness (82.6 %) and use (48.8 %) of available EYS dietary guidelines were found. A key reason for not using guidelines was 'I know what is healthy without them.' The question about whether following food and drink guidelines should be voluntary or statutory generated mixed findings. More research is required to understand the factors influencing nurseries' views on whether guidelines should be voluntary or statutory.

## 1. Introduction

Good nutrition in early life is vital for healthy development, and sets the stage for good health throughout the life-course (Cusick and Georgieff, 2016; Mitchell et al., 2015). In the UK, many young children consume both too many calories and insufficient nutrients, problems that are exacerbated by food insecurity across the country and high availability of ultra-processed foods (Aceves-Martins et al., 2018; Chang et al., 2021).

In 2019 about 76% of children aged 0–4 years old in the UK spent at least some time each week in an early years setting (EYS), such as a childminder who provide care from their home, and other forms of childcare on non-domestic premises, including nurseries, pre-schools, and daycare centres (Government, 2022b). In this study, we use

“nurseries” to refer to settings on non-domestic premises offering regular childcare which may be connected to schools, or managed by a wide range of organizations including local authorities, private, or voluntary, community, or charity (VCC) organizations. The latter two groups are the most common in England (Government, 2022a). On days when a child attends an EYS full-time, an estimated 90% of their caloric intake will take place there (Mucavele et al., 2020). Despite being potential sites for health promotion, they remain an understudied setting for their influence on children's diets, including their acceptance or rejection of nutrient-rich foods.

In England, all registered EYSs have a statutory duty to fulfil the Office for Standards in Education, Children's Service and Skills' (Ofsted) Early Years Foundation Stage (EYFS) framework which requires that settings provide food that is “healthy, balanced, and nutritious”

**Abbreviations:** EBSB, Eat Better, Start Better guidelines; EMs, Example Menus; EY, early years; EYS, early years settings; EYFS, Early Years Foundation Stage framework; IDACI, Income Deprivation Affecting Children Index; Ofsted, Office for Standards in Education, Children's Services and Skills; VCC, voluntary, community, or charity organizations.

<sup>\*</sup> Corresponding author at: Policy Innovation and Evaluation Research Unit, London School of Hygiene & Tropical Medicine, Faculty of Public Health and Policy, 15-17 Tavistock Place, London WC1H 9SH, United Kingdom.

E-mail address: [Emily.Warren@lshtm.ac.uk](mailto:Emily.Warren@lshtm.ac.uk) (E. Warren).

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(Ofsted, 2019; Ofsted, 2015). However, what that means, who decides, and how that is measured is not specified. Unlike schools which serve older children, there are no statutory standards for the food and drinks served to the youngest children, despite the potential for greater public health gains due to early intervention. While numerous guidelines for parents and childcare providers exist (Porter et al., 2020), two are seen as industry standards (Warren et al., 2022): one set, called the Example Menus (EMs) is produced by the government (Government, 2017; HM Government, 2017) and one, called the Eat Better, Start Better guidelines (EBSB) that was owned by a charity at the time the survey ran but no longer appears on their website (Action for Children, 2017). Both have been developed specifically for use in EYS in England.

In England, numerous different awards schemes are run by local governments (Medway Council, 2023; Mayor of London, 2023) and charities (Early Start, 2023; Food for Life, 2023), some of which have corporate sponsors (Oliver, 2023). These awards have various foci, for example on nutrition or sustainability, and differ in how much they cost to apply, and whether or not settings use them as a justification for raising the price of foods served in settings (Warren et al., 2022).

Previous research on food provision in EYS with non-governmental and early years' member organisations, local authorities, health visitors and researchers, found that various levels and types of support are available to EYS depending on their local authority and their strategic priorities at any given time. Stark levels of disagreement across the sector about whether food standards should remain voluntary or become statutory were also identified (Warren et al., 2022). These findings align with those documented in the wider literature (Larson et al., 2011; Savage et al., 2007; Hoskins et al., 2021; Solvason et al., 2021). We conducted a nationally representative cross-sectional survey of nurseries in England to assess nurseries' awareness and use of voluntary guidelines, including how they are used and how they can be improved upon, and examine how these vary by socioeconomic deprivation and by the two main setting types in England (private and VCC nurseries).

## 2. Methods

### 2.1. 1 Sample design and participants

The sampling frame was based on the latest publicly available childcare providers inspection data from Ofsted in England (based on inspections as of March 31, 2020, and data published on 24 June 2020). We excluded settings that provide childcare on domestic premises (childminders), settings that only provide care for children at the beginning and/or end of the school day or in holiday periods, and settings listed as having zero children attending. By way of validation, twenty of these excluded sites were randomly selected and all were found to be activity-based settings (sports and leisure clubs, gymnastics studios) or other services offering non-regular care (e.g., babysitting services for events). In total, 19,197 nurseries were eligible for inclusion.

Using anecdotal evidence of increasing EYS closures and greater pressure on the sector, we assumed that fewer settings would have the capacity to respond to a survey than before the Covid-19 pandemic. In order to detect a 10% difference between nursery types at the 95% significance level with 80% power, we aimed to include 600 nurseries in our sample. Assuming a 20% response rate, we aimed to sample 3,000 nurseries. Our sample size was also limited by pragmatic time constraints; given the Ofsted database did not contain settings' contact details, we had to manually search for these.

From working with stakeholders on the survey development (see below), we knew that larger settings may operate differently from smaller settings in relation to role specification of chefs and cooks as well as being able to buy food in bulk. To ensure that very large and large settings were included in the sample, the sampling frame was divided into three groups based on the number of childcare places available: very large ( $\geq 200$  places  $n=31$ ), large (100–199 places,  $n=1,098$ ) and smaller ( $< 100$  places,  $n=18,086$ ). We sampled all very

large settings. For the large and smaller settings, within each group nurseries were organised by region, deprivation (Income Deprivation Affecting Children Index (IDACI) score) and the number of children attending to draw a systematic sample. Using a random starting point, we selected every third large provider and every seventh smaller provider. In total 3,161 nurseries were included (31 very large, 549 large and 2,581 smaller). Sampling based on deprivation was also felt to be important because existing evidence is mixed about whether and how deprivation affects food provision in EYS (Burgoine et al., 2017; Neelon et al., 2015).

### 2.2. Survey development and distribution

The survey was developed by the study team. To increase the validity of measures, where possible, items were adapted from previous surveys (Advisory Panel on Food and Nutrition in Early Years, 2010; Nicholas et al., 2013; Children's Food Trust, 2016; Neelon et al., 2017; Neelon et al., 2015; Whitaker et al., 2009; White, 2020). The survey was reviewed and revised by experts with experience conducting nutrition-related surveys with EYSs to ensure that relevant response categories were provided and reflected the range of operational realities experienced by respondents. The survey included questions about the setting and food provided; their food policies and communication; awareness, use and opinions about guidelines; challenges to providing healthy foods; and information and training needs. This paper focuses on the awareness and use of guidelines.

Following expert review, we undertook cognitive interviews with nurseries to test the survey. Due to Covid-19 restrictions and high workloads, we assumed that few nurseries would have the capacity to participate in cognitive interviews, so we randomly selected 30 nurseries not included in the sample to participate. After consent was obtained, the lead researcher explained that the purpose of the interview was to improve the survey and assess how long it took to complete. The researcher then asked participants how they interpreted certain questions, whether the multiple-choice responses adequately reflected their experience, and sought their perceptions on how the survey and specific questions could be improved. The survey was updated iteratively after each interview. The process was repeated until we received no further suggestions and the respondent felt that the survey was clear and reflective of their experience. In total the survey was tested with five nurseries.

In the process of searching for nursery contact details we learned that 301 settings had closed, giving us a sample of 2,860. An invitation, which included an information sheet and a link to the survey was distributed through Qualtrics (Qualtrics, 2021), an online survey platform; 147 emails bounced or failed to deliver. To encourage participation, participants were informed they would be entered into a draw to win a £50 gift card when the survey closed. Up to three reminder emails were sent to nurseries who had not completed the survey. The survey opened on October 4, 2021, and closed on Nov 30, 2021.

### 2.3. Data and statistical analysis

Responses were exported from Qualtrics to Stata Version 17 for data cleaning and analysis. The data was weighted to take account of the survey design and non-response rate of the survey. Appendix 1 shows the similarity of the population distribution of nurseries is to the weighted sample data distribution by region and the level of socioeconomic deprivation of the location of nurseries.

Of the 2,713 contactable nurseries, 322 (12%) completed the survey including local authority nurseries ( $n=10$ ); school-based nurseries ( $n=6$ ); private nurseries ( $n=201$ ); and VCC nurseries ( $n=105$ ). Given the small number of responses from local authority nurseries and school-based nurseries, these were excluded from the analysis. The results presented are representative of the sub-set of private and VCC nurseries.

Frequency distributions and percentages were used to describe the

**Table 1**  
Characteristics of nurseries.

	Private nursery (n = 201)		Voluntary/Community/Charity nursery (n = 105)		Total (n = 306)		Chi <sup>2</sup> - Test p-value
	n	%	n	%	n	%	
<b>Region</b>							
North (NE, NW and Y&H)	55	27.4	21	19.9	76	24.8	0.366
Middle (EM, WM, EoE)	58	28.8	33	31.5	91	29.7	
South (SE, SW, London)	88	43.9	51	48.6	139	45.5	
<b>Deprivation</b>							
Deprived	74	37.0	32	30.5	106	34.7	0.035
Average	42	20.3	20	19.1	62	19.9	
Not deprived	85	42.7	53	50.4	138	45.4	
<b>Type of nursery care</b>							
Short sessions, 2–3 h	19	9.6	40	38.1	59	19.5	0.000
Extended day care (6–8 h)	34	17.2	37	35.2	71	23.4	
Full-day care nursery (>8 h)	144	71.2	21	20.0	165	53.4	
Sessional and Full day	2	1.0	4	3.8	6	2.0	
Sessional and Extended	2	1.0	3	2.9	5	1.7	
<b>Nursery description</b>							
Independent nursery (sole trader)	136	68.3	94	89.5	230	75.7	0.000
Small chain	53	25.8	5	4.8	58	18.5	
Large chain	10	5.0	2	1.9	12	3.9	
No response	2	1.0	4	3.8	6	2.0	
<b>Food provision</b>							
Only eat food brought in from home	36	18.2	35	33.4	71	23.5	0.003
May bring food from home or provided by nursery	81	40.5	47	44.7	128	42.0	
Only eat food provided by the nursery	73	36.18	18	17.2	91	29.6	
Only allowed to bring in food for specific dietary requirements	9	4.1	3	2.9	12	3.7	
No response	2	1.02	2	1.9	4	1.3	
<b>Food preparation</b>							
Prepare and/or cook food on site	135	82.5	42	61.0	177	76.0	0.001
Order food from an external supplier	20	11.9	15	21.8	35	14.9	
Other	9	5.6	12	17.3	21	9.1	
<b>Drinks offered day before the interview</b>							
Water	165	100.0	69	100.0	234	100.0	0.092
Milk	160	97.0	67	97.1	227	97.0	
Flavoured milk	2	1.2	4	5.8	6	2.6	
Undiluted juice	4	2.4	0	0.0	4	1.7	
Diluted juice	2	1.2	0	0.0	2	0.9	
Squash/cordials/dilutes	11	6.7	1	1.5	12	5.1	
Fizzy drinks	0	0.0	0	0.0	0	0.0	
<b>Food purchased/prepare</b>							
Breakfast	138	83.2	27	39.0	165	70.0	0.000
Mid-morning snacks	144	87.1	67	97.1	211	90.1	
Lunch	135	81.5	25	36.3	160	67.9	
Mid-afternoon snacks	135	81.5	51	73.9	186	79.2	
Tea/dinner/evening meal	118	70.9	18	26.1	136	57.5	
Late snack	30	17.8	12	17.3	42	17.6	
Help themselves to snacks throughout the day	13	8.0	1	1.5	14	6.0	
Other	2	1.2	2	2.9	4	1.7	
<b>Written food policy</b>							
Yes	170	84.3	81	77.1	251	81.8	0.202
No	3	1.5	1	1.0	4	1.3	
Follow a general rule	28	14.2	22	21.0	50	16.5	
No response	0	0.0	1	1.0	1	0.3	
<b>Provision of food policy information to parents/carers</b>							
Written policy provided when child registered	93	46.8	50	48.5	143	47.4	0.579
Speak with parents/carers about food when child is registered	117	60.4	66	64.1	183	61.7	
Speak to parents/carers if concerns about food & drink brought	51	25.8	36	35.0	87	29.0	
No	10	5.1	3	2.9	13	4.4	

characteristics of nurseries. Pearson's  $X^2$  test was used to assess the differences in the distribution of the characteristics by nursery type (private or VCC), sample size allowing. The outcome variables of interest were awareness and use of the two voluntary guidelines (EMs and EBSB) in the last 12 months— based on the survey question “In the last 12 months, have you used the [guideline]?” (Response options (i) have used them; (ii) aware of them but not used them; and (iii) not aware of them).

Awareness and use of voluntary guidelines were examined by nursery characteristics for private and VCC nurseries separately. Explanatory variables included location (region), deprivation status of location, type of nursery care provided, provision of food by nursery, food preparation,

and availability of written food policy at nursery.

To examine factors that influenced use of the voluntary guidelines, a binomial multivariate logistics regression model was estimated (Wool-dridge, 2010). To be able to interpret both the coefficients and the signs, and to estimate the proportion of use of the guidelines explained by the factors included in the model, we used mfx and marginal analysis function in Stata to generate the coefficients (Williams, 2012; Wool-dridge, 2010). The analysis was done separately for private nurseries, VCC nurseries and both combined. Appendix 2 shows the variables and definition of variables included in the models. The distribution of awareness and use of both guidelines were analysed by location, deprivation, type of nursery care, food provision, food preparation and

provision of written policy.

Ethical approval was obtained from the London School of Hygiene & Tropical Medicine's Ethics Committee (ref: 22664). The survey is available upon request.

### 3. Results

Overall, 306 nurseries were included in the analysis; 201 (66%) were private nurseries and 105 (34%) were VCCs. Nurseries characteristics are presented in [Table 1](#).

#### 3.1. Voluntary or statutory food and drinks standards

Respondents were asked to choose which of three statements best reflected their views on the voluntary nature of the current guidelines. A small percentage (5.9%) of respondents believed that the current system of having voluntary guidelines should continue, 42.2% reported that settings should be able to choose what to serve without adhering to food and drink standards, 34.0% think they should be statutory, and 17.9% did not answer this question (see [Fig. 1](#)). Noteworthy similarities are apparent across both nursery types and levels of socioeconomic deprivation (data not shown).

#### 3.2. Awareness and use of guidelines

Overall 82.6% of respondents reported they were aware of either guideline and 48.8% used either guideline. The survey results indicate considerable discrepancies between awareness and use of available guidelines, see [Fig. 2](#). Respondents across both nursery types reported higher levels of awareness of EMs (67.0% overall; 70.2% private nurseries were aware compared to 60.9% of VCCs) than the EBSB guidelines (58.6% overall; 63.5% private nurseries vs. 49.5% VCCs). However, reported use was higher for EBSB (31.3% overall) than EMs (21.8% overall): 34.8% of private nurseries and 24.7% of VCCs used EBSB compared to 25.9% of private nurseries and 14.3% of VCCs used EMs.

The breakdown of awareness and use by different characteristics is presented in [Appendix 3](#).

Ninety-five per cent of nurseries reported using sources of information and advice beyond these two guidelines. The most common sources were other government documents (61.7%) and guidance from child-care membership organizations (34.9%) (data not shown).

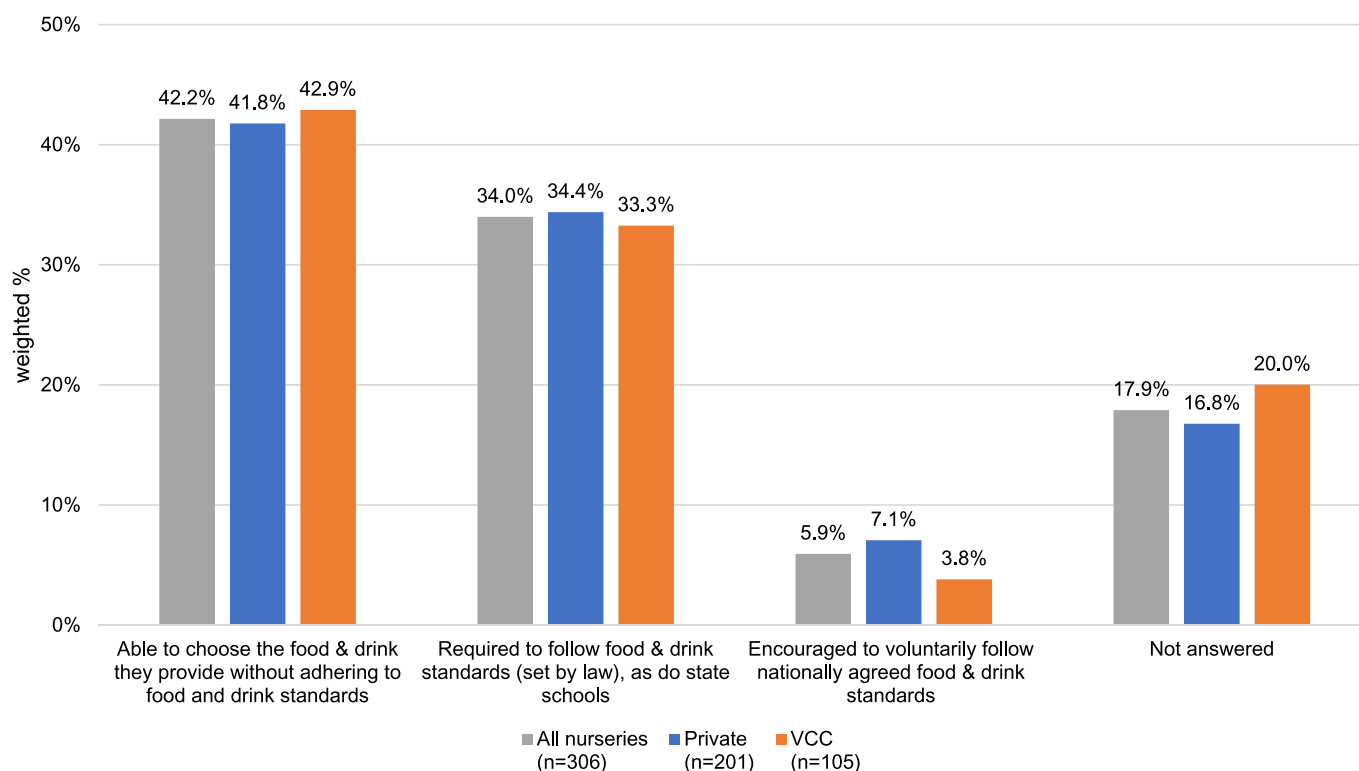
#### 3.3. Reported reasons for differences in use of guidelines

The reasons for not using the two guidelines despite being aware of them are presented in [Figs. 3 and 4](#). The most common reason for not using either guideline was that respondent 'know[s] what healthy is without them' (34.3% for EMs and 40.8% for EBSB). The percentage of respondents reporting they have never had access to guidelines was lower for EMs (8.3%), which are freely available online, than EBSB guidelines (22.0%). Respondents from VCCs were more likely to report never having accessed EBSB guidelines than respondents working in private nurseries, 39.1% vs. 14.7%. Among users that have never used EMs 22.4% 'prefer to use the EBSB guidelines', whereas only 9.0% of EBSB users stated they preferred to use EMs.

#### 3.4. Reported usefulness of guidelines

All respondents that had used the guidelines considered them to be useful, see [Appendix 4](#). Fifty-six per cent considered EMs and 70.6% considered EBSB guidelines to be very or extremely useful. Among these respondents, the most common uses of these guidelines were as a general reference for healthy eating for both guidelines (64.4% for EMs and 74.8% for EBSB), followed by to plan menus for EMs (61.8%) and for ideas to encourage healthy eating for EBSB (62.0%), see [Fig. 5](#). A key difference emerged in use of the two guidelines to plan menus, with 61.8% of EMs users reporting they use them to plan menus compared to only 37.3% of EBSB users.

When asked to select how the EM and EBSB could be improved, the most commonly selected suggestions included more advice on how to



**Fig. 1.** Respondents perception of whether all early years settings registered with Ofsted should have to follow food and drink standards, by nursery type.

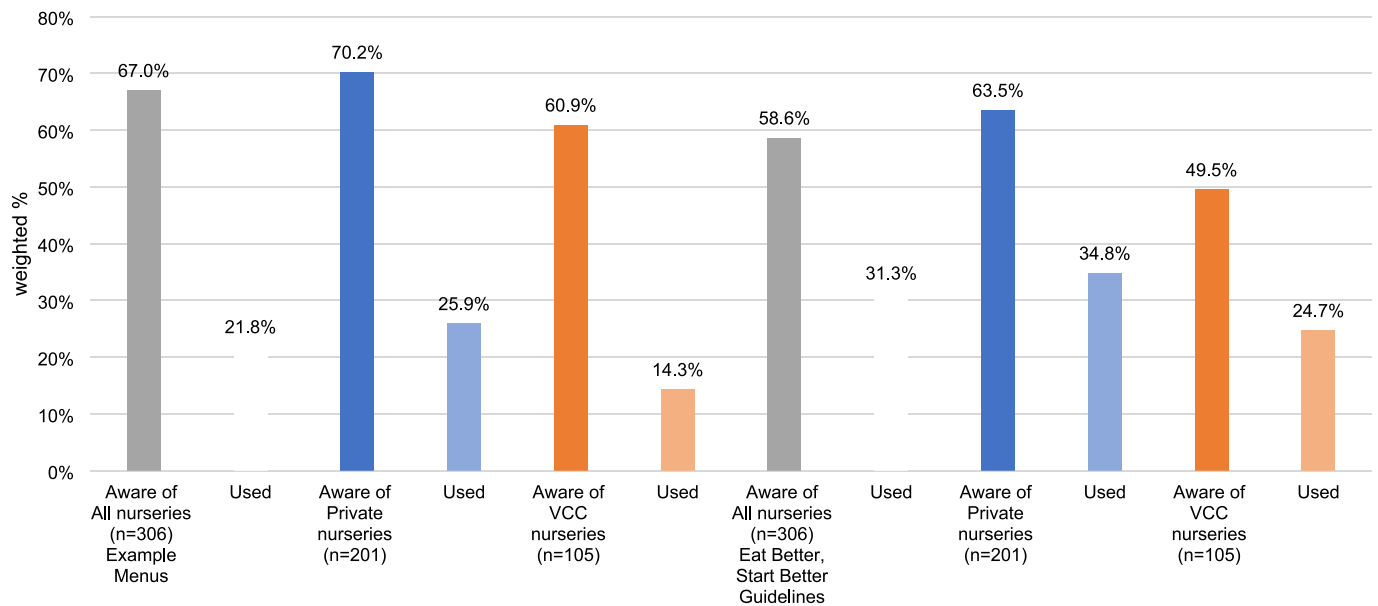


Fig. 2. Awareness and use of nutritional guidelines, by nursery type.

accommodate dietary restrictions (46.4% and 40.2%, respectively), offering suggestions for foods from a more diverse array of cultures (42.9% and 48.1%, respectively) and reflect more closely what children will eat (32.1 and 44.4%), see Appendix 5.

Only 7.3% of respondents indicated that they did not need guidance on any food, drink, or nutrition-related issues. Participants most frequently reported that they would like guidance on supporting fussy eaters (61.9%) followed by providing healthy foods at an affordable cost (40.5%) (data not shown).

### 3.5. Factors associated with the use of guidelines

Table 2 presents the results of the multivariate logistic regression. Across both nursery types, total number of children enrolled at the setting, and working toward an award were significantly associated with use of guidelines. For each additional child that attends the nursery, the use of guidelines increased by 0.2% (95 % CI 0.1% to 0.4%). Also, nurseries working towards an award were 56.6% (95 % CI 14.3% to 99.0%) more likely to use guidelines compared to those that were not. Apart from total enrollment, no other factors were found to influence the use of guidelines in VCC nurseries. Among private nurseries, those that hold a healthy eating or food-based award, or are currently working towards an award, were 18.9% (95 % CI 0.026, 0.351) and 46% (95% CI 0.041, 0.878) more likely to use guidance than nurseries that do not hold an award or are not working towards an award, respectively, while those offering only short-term sessions (2–3 h per day) (−0.347 [95 % CI −0.652, −0.042]) and those in the Midlands/East of England (−0.194 [95 % CI −0.359, −0.030]) were less likely to use guidelines than settings open more than 8 h per day and those in Southern regions, respectively.

## 4. Discussion

To our knowledge this is the first nationally representative cross-sectional survey of nurseries in England aiming to assess their awareness and use of voluntary guidelines for food and drink, including how they are used, how they can be improved upon, and how these vary by setting type. The findings point to considerable discrepancies between awareness (82.6%) and use (48.8%) of available EYS dietary guidelines. Use was low with only 31.3% using the EBSB guidelines and only 21.8% using the EMs. A key driver of use of either guideline across all nurseries

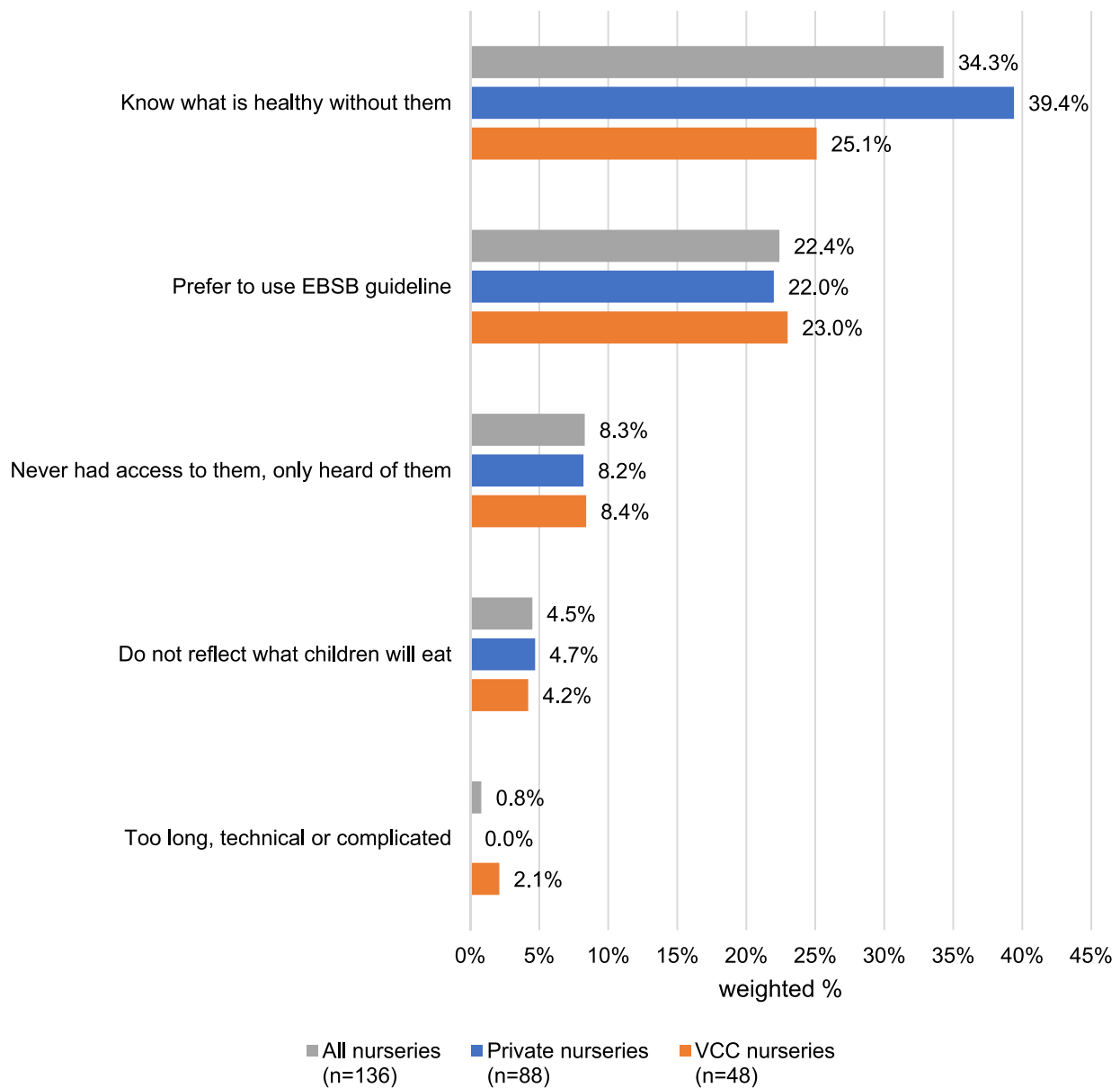
surveyed was currently working towards a food-based award.

While reported awareness of both guidelines was high, reported use was much lower across both nursery types. Nurseries were more likely to use EBSBs guidelines than EMs, and among those who did use these guidelines, more considered EBSBs to be very or extremely useful than EMs. This may be caused by greater familiarity (the EBSB guidelines were released first) or their enhanced visual appeal with useful photographs and visual aids. We also found that the majority of surveyed nurseries used other sources of information to help plan healthy, affordable meals. This raises questions about why nurseries know about existing resources but choose not to use them, highlighting the unhelpful multiplicity of available EYS guidelines (Porter et al., 2020), and drawing attention to poor dissemination strategies about these guidelines.

Second, differences in awareness and use of guidelines were experienced across nursery types: VCC nurseries were less likely than private nurseries to be aware of either guideline, and, where VCC nurseries were aware of them, they also reported more challenges using guidelines. Our research indicates that having or working towards a food-based award and being in a larger nursery, are both drivers of increased guideline use. We would propose that working towards an award raises the profile of good nutrition amongst nursery staff and following age-appropriate guidance is a feature of many award programmes. Larger settings may be more likely to use guidelines because their size and staff numbers enable them to hire people with distinct roles, such as chef, who can specialise in healthy and age-appropriate eating. They may also benefit from being part of a chain or group of nurseries. This finding fits within the literature on the particular challenges that childminders face in simultaneously caring and cooking for children (Warren et al., 2022).

The analysis identified limited evidence of inequalities in use of guidelines by socioeconomic deprivation but identified that nurseries in the Midland regions were less likely to use guidelines. This finding was unanticipated. The existence of food-related inequity in the UK is clear (Neelon et al., 2017): the UK has the highest rate of food insecure children in Europe (Organization, 2018) and the use of food banks has increased 81% since 2016–2017 (The Trussell Trust, 2021). It is possible that being published seven years ago, the value of guidelines has hit ceiling effects and the settings with interest in using guidelines have now all had sufficient time to do so. Further work is needed to explore this finding more fully.

Third, a key reason for not using guidelines was ‘I know what is



**Fig. 3.** Reasons for not using Example Menus among respondents who are aware of them but not used them, by type of nursery. Respondents could select the two most important reasons.

healthy without them.’ This could be due to settings seeking information from sources other than guidelines. It may be partly explained by findings reported elsewhere (Warren et al.) indicating that in nurseries that only allow children to eat food provided by the nursery, a lack of staff trained to cook and prepare healthy food is one of their biggest challenges. The tension between settings reporting that they know what is healthy without the guidance while reporting that insufficiently trained staff are a barrier to cooking and preparing healthy foods needs to be explored in future qualitative research. It may be that setting managers and chefs who completed the survey feel they have sufficient knowledge, while childcare providers do not. Regardless, investing in healthy food provision, including training of staff to do so, must be considered a priority, as it is for older children. Findings point to ways that these guidelines could be improved to further support on issues like encouraging fussy eaters, providing healthy foods at affordable cost, managing dietary restrictions, having a culturally diverse offering, and reflecting what children would like to eat.

Fourth, 17.9% of respondents did not answer the question about whether following food and drink guidelines should be voluntary or

statutory, potentially indicating high levels of uncertainty on this issue (which qualitative evidence has also indicated to be contentious in the sector) (Warren et al., 2022). Moreover, only 5.9% of respondents report that the current system, in which nurseries are allowed but not required to follow voluntary food standards, aligns with their preference. Remarkably similar views were held across nursery types and levels of socioeconomic deprivation. Based on our earlier qualitative research with stakeholders across the EY sector, we predicted that settings in deprived areas would be more likely to support statutory food standards so that children from disadvantaged backgrounds consume food and drinks that meet a minimum standard that may not be achievable at home (Warren et al., 2022). However, the survey findings did not support this. What the global literature does tell us is that voluntary (vs statutory) policies to improve the food environment and diets are not effective, because they are typically not supported with the best evidence, and do not include support for implementation, monitoring, and evaluation of effectiveness (Knai et al., 2018; Lelieveldt, 2023). As reported by an early years newsletter after the publication of the EBSB guidelines in 2012, “Most

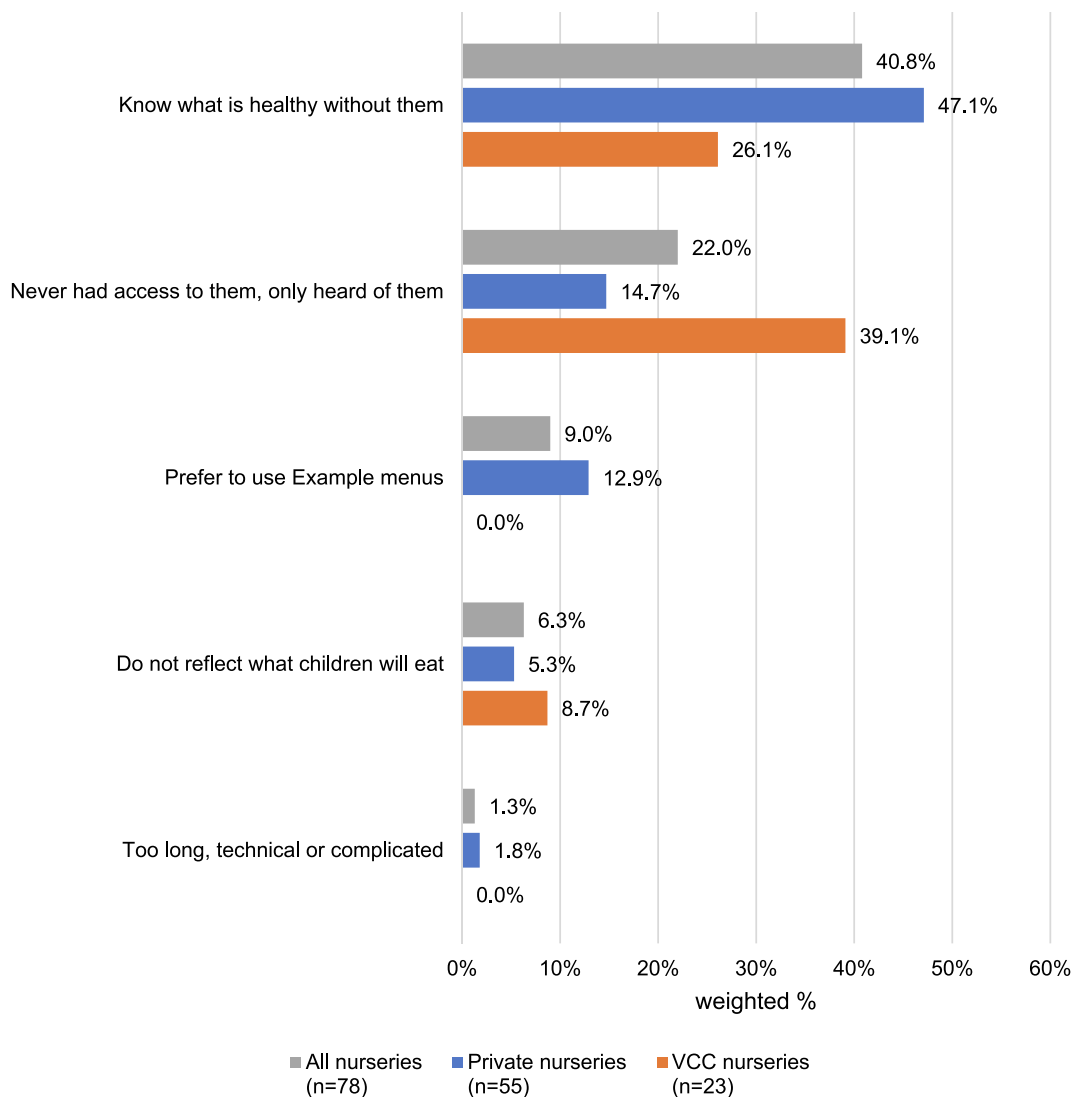


Fig. 4. Reasons for not using EBSB guidelines among respondents who are aware of them but not used them, by type of nursery. Respondents could select the two most important reasons.

*disappointing of all, adhering to the guidance remains voluntary – early years providers can choose to totally ignore it if they want to. If you do choose to follow the guidance to the letter, there’s no stamp of approval process to acknowledge and recognise your commitment to the wider community. So where’s the incentive?” (Denby, 2012).*

### 5. Strengths and limitations

This is the first nationally representative cross-sectional survey of nurseries in England to assess their awareness and use of voluntary guidelines, and as such provides unique insight on a key government initiative to support EYS to provide healthy food. Our achieved sample was well matched to the population of EYS in terms of nursery size, location (region) and deprivation level. No good national data is available for other variables, so we cannot comment on how representative the achieved sample is in terms of other characteristics, such as nursery type.

There are a number of limitations of this research due to our lower than expected response rate (12%). For example, it restricted the analyses we could undertake in relation to nursery type, as we had to exclude local authorities and school-based nurseries from the analysis because of the small number of respondents from these settings. While considerable efforts were made to increase participation, future research

studies may need to do more to support EYS to engage in research.

Similarly, we had planned to explore findings in more depth, for example, by specific region in England and by deprivation quintile, however the achieved sample size limited what was feasible. This data would have helped us explore implications for the government’s level-up agenda and future research should seek to explore inequalities further. We found that nurseries in the Midlands were less likely to use guidelines, but our research did not provide indications as to why this may be. Future research should seek to confirm and explain this finding. Also, for a few results presented in the appendices, our bases are quite small (around 30) so they must be treated with caution.

We are unable to predict the direction of bias in this survey. Some settings may have felt pressure to present their setting in the best possible light (social desirability bias) while others may have wanted to emphasize the challenges they face and completed the survey as an expression of discontent or frustration. Moreover, the topic of the survey may have encouraged more engaged nurseries to take part, or it may have put off others who have no interest in nutrition.

### 6. Policy implications

More government investment is required to understand the factors influencing English nurseries’ views on whether guidelines should be

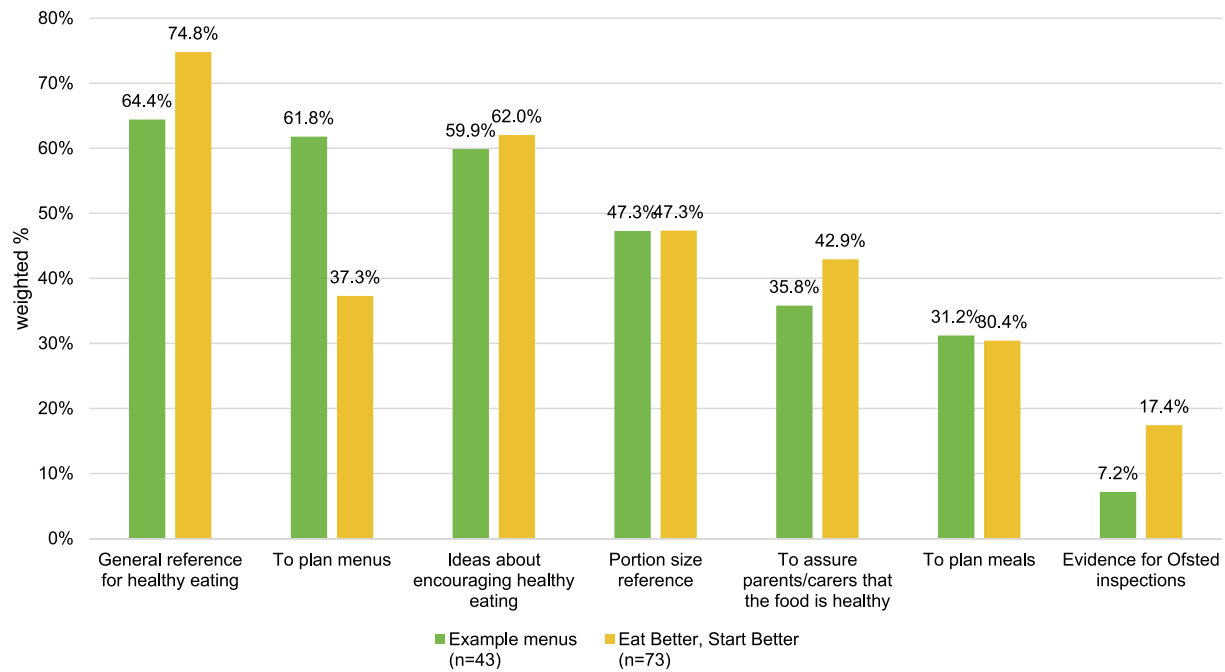


Fig. 5. Uses of guidelines among respondents from private nurseries that found the guidelines very or extremely useful, by guideline type. Respondents could select all that apply.

Table 2

Marginal effect logistic regression results of determinants of use of food and nutritional guidelines (either Example Menus or Eat Better, Start Better guidelines) by nursery schools.

	Private nurseries			Voluntary/Community/Charity nurseries			All		
	dy/dx	95 %CI	t	dy/dx	95 %CI	t	dy/dx	95 %CI	t
<b>Nursery services (ref. Full-day care nursery (more than 8 h per day))</b>									
Sessional day care (short sessions, 2–3 h)	–0.347**	–0.652,–0.042	–2.24	–0.101	–0.407,0.205	–0.65	–0.139	–0.332,0.055	–1.41
Extended day care (6–8 h)	–0.063	–0.312,0.186	–0.50	0.061	–0.221,0.344	0.43	–0.045	–0.222,0.132	–0.50
<b>Food provision (ref. Children only eat food brought in from home)</b>									
Children may bring in food from home or food provided by nursery	–0.052	–0.199,0.094	–0.71	–0.190	–0.465,0.084	–1.36	–0.076	–0.203,0.052	–1.17
<b>Food preparation (ref. Order from external supplier)</b>									
We prepare and/or cook food on site	0.084	–0.092,0.260	0.95	0.062	–0.194,0.317	0.47	0.089	–0.055,0.234	1.22
<b>Have a written policy (ref. No/Follow a general rule)</b>									
Yes	0.088	–0.135,0.312]	0.78	0.106	–0.256,0.467	0.57	0.125	–0.060,0.310	1.33
<b>Hold a healthy eating or food-based award (ref. No)</b>									
Yes	0.189**	0.026,0.351	2.30	–0.150	–0.431,0.131	–1.05	0.087	0.056,0.230	1.20
<b>Currently working towards an award (ref. No)</b>									
Yes	0.460**	0.041,0.878	2.17	–	–	–	0.566***	0.143,0.990	2.64
<b>Has an award and/or currently working towards an award (Ref. No)</b>									
Yes	0.006	–0.154,0.166	0.07	0.035	–0.279,0.349	0.22	–0.006	–0.144,0.132	–0.09
<b>Speak with all parents about food policy (Ref. No)</b>									
Yes	0.141	–0.027,0.310	1.65	0.017	–0.254,0.287	0.12	0.085	–0.055,0.225	1.20
<b>Deprivation (Ref. Not deprived)</b>									
Deprived	0.041	–0.135,0.217	0.46	–0.176	–0.549,0.198	–0.92	0.006	–0.144,0.157	0.08
Average deprived	–0.015	–0.208,0.177	–0.16	–0.087	–0.499,0.324	–0.42	–0.027	–0.202,0.148	–0.30
<b>Region (Ref. South (SE, SW, London))</b>									
North (NE, NW, Y&H)	–0.085	–0.242,0.072	–1.07	–0.042	–0.332,0.248	–0.28	–0.043	–0.180,0.094	–0.62
Middle (EM, WM, EoE)	–0.194**	–0.359,–0.030	–2.34	0.002	–0.304,0.308	0.01	–0.139*	–0.289,0.010	–1.84
<b>Total number of children enrolled at nursery</b>	<b>0.002**</b>	<b>0.000,0.004</b>	<b>2.43</b>	<b>0.005**</b>	<b>0.001,0.010</b>	<b>2.27</b>	<b>0.002***</b>	<b>0.001,0.004</b>	<b>2.81</b>
<b>Overall prediction of use</b>									
Observations	0.546			0.325			0.498		
	162			64			229		

Note: Ref. represent reference category; \* p ≤ 0.1; \*\* p ≤ 0.05; \*\*\* p ≤ 0.001; NE-North East region; NW-North West region; Y&H-Yorkshire and the Humber region; EM-East Midlands region; WM-West Midlands region; EoE-East of England region; SE-South East region; SW-South West region

voluntary or statutory. A key consideration found in earlier research (Warren et al., 2022) is that EYS report being overwhelmed, underfunded and facing numerous challenges in relation to food provision. Therefore, it is unclear whether settings are opposed to the guidelines in

principle, or if they are opposed to taking on additional onerous work in the context of an unsupportive economic and policy environment. The issue is contentious and because the sector is diverse and includes such a wide range of settings with various facilities, consultation will be key to



understand concerns, fears, barriers, facilitators, and opportunities. The sector needs meaningful support and active consultation to deliver a system that meets the nutritional health needs of young children. Despite the existence of guidelines to promote healthy eating, a recent Cochrane review found little evidence that healthy eating interventions in EYS improve diet or indicators such as BMI (Yoong et al., 2023). Further research specifically on the impacts associated with, or caused by, the uptake of guidance would be helpful, as would more evaluations of programmes that were found to be effective in similar contexts to the UK (Kipping et al., 2023). Future research should also explore how the experiences of private and VCC nurseries in England are distinct from or aligned with other nursery types and other settings, such as childminders, who remain under-researched.

This research also aligns with existing studies in different countries and highlights the importance of policies which invest in the nutritional requirements of infants and toddlers in EYS. For example, a 2017 study of how childcare settings in Australia determined the nutritional adequacy of food provided to children in their care found that personal knowledge and common sense were cited as ways of gauging nutritional adequacy, and staff reported a lack of existing nutrition guidelines (Cole et al., 2017). In New Zealand, Gerritsen et al. (2017) surveyed childcare settings in three regions focusing on the food menus, and found that most menus did not comply with current nutrition guidelines.

The implications of this research for policy in England, but also further afield, are first and foremost, to increase funding for the early years sector and inclusion of EYS in childcare-related policy decisions, including the development and/or implementation of dietary guidelines; second, to address regional and deprivation-related differences in awareness and uptake of dietary guidelines for EYS; and third, to explore the possibility of making EYS dietary guidelines mandatory (in line with English School Food Standards).

## 7. Conclusion

For the majority of families, nurseries and other early years' care providers such as childminders (though not represented in our survey) are at the frontline of feeding our children in settings, many or all days a

week, until they are old enough to attend mainstream school. Prioritising the support EYS receive, by providing one coherent set of dietary guidelines that capture cultural and dietary diversity and needs, help settings provide healthy meals at an affordable cost, as well as proper systematic training for all staff, should be a straightforward and obvious priority.

## CRediT authorship contribution statement

**Emily Warren:** Conceptualization, Methodology, Software, Investigation, Validation, Formal analysis, Data curation, Writing – original draft. **Paul Boadu:** Methodology, Software, Validation, Formal analysis, Data curation, Writing – original draft. **Josephine Exley:** Methodology, Software, Validation, Formal analysis, Data curation, Writing – original draft. **Lorraine Williams:** Writing – review & editing. **Bob Erens:** Methodology, Validation, Formal analysis, Writing – review & editing. **Cécile Knai:** Funding acquisition, Conceptualization, Writing – review & editing.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix 1. EYS population and sample distribution by regional groupings and deprivation

	Population		Survey sample		
	n	%	n	Weighted %	Unweighted %
<b>Region</b>					
North (NE,NW and Y&H)	4582	23.9	79	24.5	24.5
Middle (EM, WM, EoE)	5711	29.8	94	29.2	29.2
South (SE, SW, London)	8896	46.4	149	46.4	46.3
Not recorded	8	0.04	0	0	0
<b>Total</b>	<b>19,197</b>	<b>100</b>	<b>322</b>	<b>100</b>	<b>100</b>
<b>Deprivation (IACDI)</b>					
Deprived (Deprived, Most deprived)	6943	36.2	111	34.5	34.5
Average	3928	20.5	67	20.5	20.8
Not Deprived (less deprived, least deprived)	8318	43.3	144	45.0	44.7
Unknown	8	0.04	0	0	0
<b>Total</b>	<b>19,197</b>	<b>100</b>	<b>322</b>	<b>100</b>	<b>100</b>

TABLE NOTE: EoE = East of England, EM = East Midlands, IDACI = Income deprivation affecting children index NE = North East, NW = North West, SE = South East, SW = South West, WM = West Midlands, Y&H = Yorkshire and the Humber.

**Appendix 2. Variables, definition and measurement**

Variables	Variable definition and measurement
<b>Proxy variables for descriptive analysis</b>	
Awareness of guidelines	Awareness of guidelines (Example Menus and/or Eat Better, Start Better guidelines) Dummy variable: 1 if the EYS selected options (i) Yes, I have used them and/or (ii) I am aware of them but have not used them, and zero otherwise; This was generated for awareness of each guideline, and a joint proxy for the awareness of both guidelines.
Use of guidelines	Use of guidelines (Example Menus and/or Eat Better, Start Better guidelines) Dummy variable: 1 if EYS selected option (i) Yes, I have used them, and zero, otherwise. This was generated for the use of each guideline, and a joint proxy for the use of both guidelines.
<b>Regression model</b>	
<b>Dependent variable</b>	
Use of voluntary guidelines	Use of Example menus and/or East Better, Start Better guidelines. A dummy variable, measured as 1 if the early years setting (EYS) selected “Yes, I have used them” for Example menus and/or Eat Better, Start Better guidelines, and zero (0) otherwise.
<b>Explanatory variables</b>	
Nursery services	Type of nursery care services provided by EYS. Dummy variables: 1 if the EYS provide sessional day care (short sessions, 2–3 h) services, and zero (0), otherwise; 1 if the EYS provide extended day care (6–8 h) services, and zero (0), otherwise; 1 if the EYS provide full-day care nursery (more than 8 h per day) services, and zero (0), otherwise
Food provision	Sources of food eaten at EYS. Dummy variables: 1 if children only eat food brought from home at EYS, and zero (0), otherwise; 1 if children may bring in food from home or eat food provided by the nursery, and zero (0), otherwise; 1 if children are only allowed to bring in food for specific dietary requirements, and zero (0), otherwise; 1 if children only eat food provided by nursery
Food preparation	Who prepares the food served in the EYS? Dummy variables: 1 if food is prepared and/or cooked at EYS, and zero (0), otherwise; 1 if food is ordered from an external supplier (e.g. catering or a school), and zero (0), otherwise
Written policy	Existence of written policy at EYS. Dummy variable: 1 if the EYS has a written policy and zero (0), otherwise;
Hold award	Has the EYS achieved a healthy eating or food-based award? A dummy variable defined as 1 if the EYS holds an award, and zero (0), otherwise
Working toward award	Is the EYS currently working towards attaining an award? A dummy variable defined as 1 if the EYS is currently working towards attaining an award, and zero (0), otherwise
No award and not working towards award	Does EYS have an award and/or currently working towards a food award? A dummy variable defined as 1 if EYS has no award and are not currently working towards a food award and zero (0), otherwise
Speak with all parents/carers about food policy	Provision of information about food and drink should or should not be brought to EYS to parents/carers A dummy variable defined as 1 if EYS speak to all parents about food and drink should or should not be brought in, and zero (0), otherwise
Deprivation status	Deprivation status of location of EYS Dummy variables: 1 if EYS is located in deprived (Most deprived and deprived) location, and zero (0), otherwise 1 if EYS is located in average deprived location, and zero (0), otherwise 1 if EYS is located in not deprived (less deprived, least deprived) location, and zero (0), otherwise
Region	Regional location of EYS Dummy variables: 1 if EYS is located in the North (North East, North West and Yorkshire and Humber) region, and zero (0), otherwise; 1 if EYS is located in the Middle (East Midlands, West Midlands and East of England) regions, and zero (0), otherwise; and 1 if EYS is located in the South (South East, South West and London) regions.
Enrolment	Total number of children enrolled in EYS, measured as numerical continuous variable

**Appendix 3. Awareness and use of nutritional guidelines, by nursery type (row weighted %)**

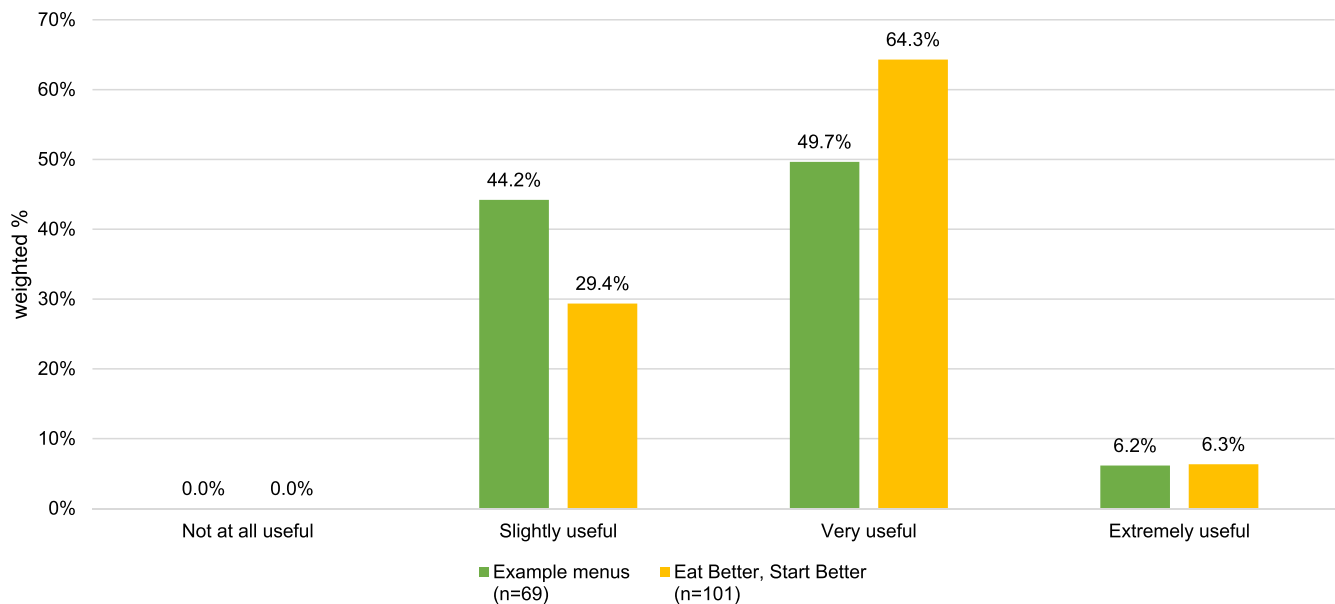
	Private nurseries							VCC nurseries						
	n	EMs		EBSB guidelines		EMs and/or EBSB		n	EMs		EBSB guidelines		EMs and/or EBSB	
		Aware of (%)	Used (%)	Aware of (%)	Used (%)	Aware of (%)	Used (%)		Aware of (%)	Used (%)	Aware of (%)	Used (%)	Aware of (%)	Used (%)
<b>Total</b>	201	70.2	25.9	63.5	34.8	82.3	48	105	60.9	14.3	49.5	24.7	72.4	32.3
<b>Region</b>														
North	55	68.4	33.7	59.2	38.9	81.4	51.9	21	52.2	19.1	33	23.5	56.9	33
Middle	58	63.1	22.6	56.2	22.9	73.7	33.4	33	57.6	15.2	39.4	18.2	66.7	27.3
South	88	76	23.1	71	40.1	88.4	55.1	51	66.7	11.8	62.8	29.4	82.4	35.3
<b>Deprivation</b>														
Deprived	74	69.9	27.4	64.4	31.8	79.5	46.8	32	56.3	21.9	50	28.1	68.8	40.6
Average	42	77.5	37.7	57.4	32.7	87.5	55.2	20	75	0	55	20	85	20
Not deprived	85	67	18.9	65.6	38.5	82.2	45.6	53	58.4	15.1	47.1	24.4	69.8	32
<b>Type of nursery care</b>														

(continued on next page)

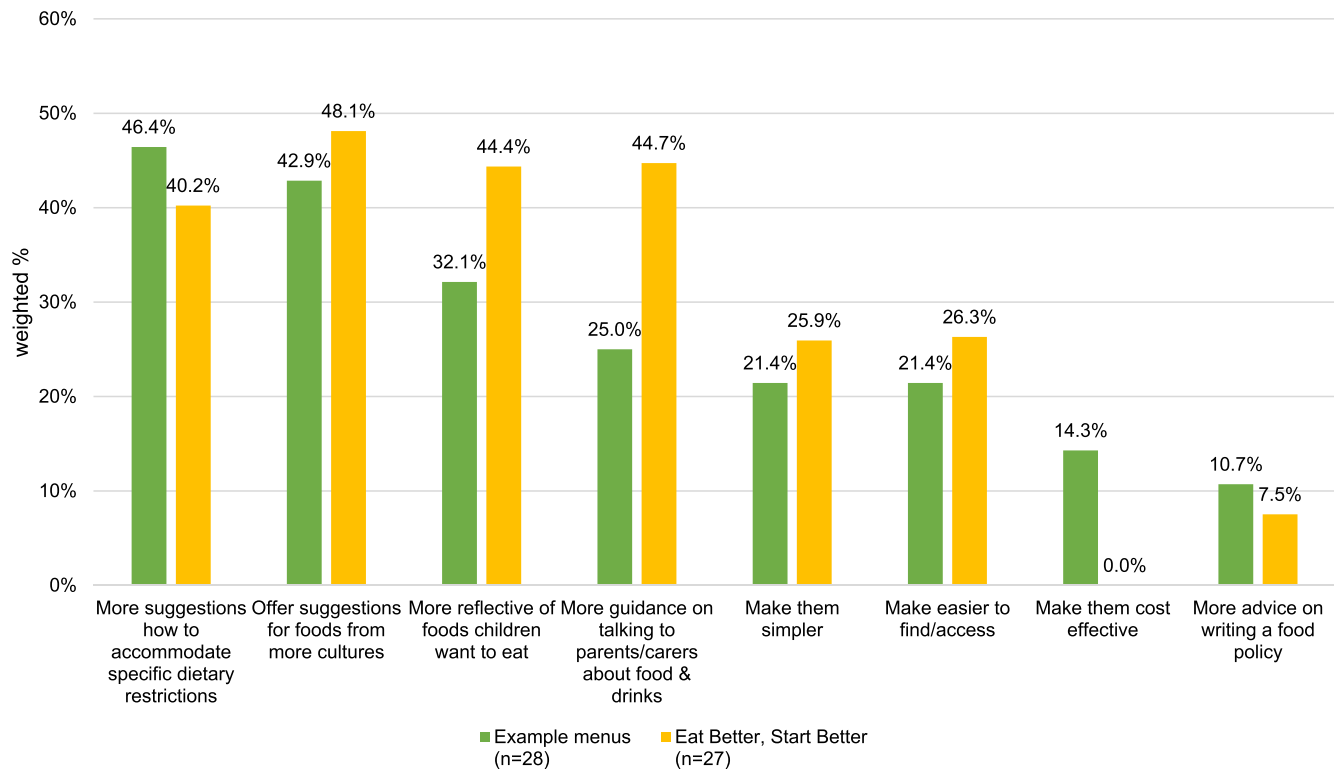
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	Private nurseries							VCC nurseries						
	n	EMs		EBSB guidelines		EMs and/or EBSB		n	EMs		EBSB guidelines		EMs and/or EBSB	
		Aware of (%)	Used (%)	Aware of (%)	Used (%)	Aware of (%)	Used (%)		Aware of (%)	Used (%)	Aware of (%)	Used (%)	Aware of (%)	Used (%)
Short sessions, 2–3 h)	19	63	10.6	57.7	15.9	73.6	26.5	40	52.5	10	40	17.5	60	22.5
6–8 h	34	58.6	11.8	64.8	29.3	82.3	35.2	37	64.8	13.6	56.6	32.3	81	37.7
More than 8 h per day	144	74.6	31.3	62.9	38.3	82.9	53.9	21	66.7	23.8	52.4	28.6	76.2	47.6
<b>Food provision</b>														
Only eat food brought in from home	36	58.1	8.4	61.2	19.6	80.5	27.9	35	57.1	5.7	48.6	22.9	68.6	22.9
Bring food from home or provided by nursery	81	69.9	28.5	63.6	32.5	81.2	48.7	47	61.6	12.8	48.8	25.4	76.6	31.8
Only eat food provided by the nursery/only allowed to bring in food for specific dietary requirements	82	75.3	31.8	63.5	43.7	83.7	56.3	21	66.7	28.6	52.4	23.8	71.4	47.6
<b>Food preparation</b>														
Prepare and/or cook food on site	135	73.8	34.1	64.5	39.8	84.2	55.7	42	69.1	23.8	47.6	26.2	73.8	40.5
Order food from an external/other supplier	29	67.8	10.4	60.7	32.1	75.0	39.2	27	55.4	11.2	55.0.4	25.7	77.7	33.1
<b>Written food policy</b>														
Yes	170	71.9	27.7	65.8	39.5	84.4	52.1	81	69.1	16.1	54.3	27.1	77.8	35.7
No/follow a general rule	31	61.0	16.2	51.3	9.7	70.8	26.0	23	34.8	8.7	34.8	17.4	56.5	21.7

**Appendix 4. Among respondents that used the guidelines, how useful did they find them**



## Appendix 5. How guidelines should be improved, among respondents that found them somewhat useful. Respondents could select up to three options



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